AI as Legal Persons - Past, Patterns, and Prospects

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Abstract. This paper examines the debate on AI legal personhood, emphasizing the role of path dependencies in shaping current trajectories and prospects. Three primary path dependencies emerge: prevailing legal theories on personhood (singularist vs. clustered), the actual participation of AI in socio-digital institutions (instrumental vs. non-instrumental), and the impact of technological advancements. We argue that these factors dynamically interact, with technological optimism fostering broader attribution of the legal entitlements to AI entities and periods of scepticism narrowing such entitlements. Additional influences include regulatory cross-linkages (e.g., data privacy, liability, cybersecurity) and historical legal precedents. Current regulatory frameworks, particularly in the EU, generally resist extending legal personhood to AI systems. Case law suggests that without explicit legislation, courts are unlikely to grant AI legal personhood on their own, although some authors suggest that the courts can do so. For this to happen, AI systems would first need to prove *de facto* legitimacy through sustained participation within socio-digital institutions. The chapter concludes by assessing near- and long-term prospects for legal personification, from generative AI and AI agents in the next 5–20 years to transformative possibilities such as AI integration with human cognition via Brain-Machine Interfaces in a more distant future.

1. Introduction

A recurring tale often appears in discussions of legal personhood, originating from Gustav Schwarz's *Rechtssubjekt und Rechtszweck* ('Legal Subject and Purpose'). Schwarz opens with an imaginary dialogue between a group of ancient philosophers who, having awakened from centuries of slumber, are astonished by modern life (Schwarz, 1908).[1] In particular, observing a streetcar running along its tracks, the philosophers ponder its nature and the unseen force behind its movement. This dialogue unfolds as follows:

- 1st Philosopher: "There can't be a cart without a horse. Yet, this strange cart moves without any beast of burden in sight. Those who refuse to abandon logic must assume that a horse is present, albeit invisible — perhaps a fictitious one pulling the cart".
- 2nd Philosopher: "You're mistaken. No fiction can pull a cart. A real horse is essential, though it may not be visible now. We can assume it was present before or will appear later. There's no need for fiction: past or future horses pull the cart".
- 3rd Philosopher: "You're both wrong. There's no need to search for real or imaginary animals. It's evident that an organism is driving the cart — the streetcar company itself! It's like an individual with a head, torso, hands, and feet — representing its management, shareholders, and employees. And it has a will that moves the cart.
- 4th Philosopher: "You're all speaking in metaphors! Metaphorical hands and feet can't even push a stroller. This cart isn't driven by anyone, not even the person sitting in the front. The wiser conclusion is that these are horseless carts, somehow self-propelled".
- 5th Philosopher: "I am convinced! This must be a new kind of cart, powered by an entirely different force. Let's not confuse it with the old kind".

The philosophers conclude that a force does drive the cart, though its nature, rather than a specific animal pulling it, is what matters. In later versions of the story, a sixth philosopher joins the conversation, urging his colleagues to consider how human beings still govern it despite the new driving force. He argues that the question lies in understanding how humans control this force and for what purpose.

The tale mirrors the spectrum of thought in legal personhood theory, from rigid formalism to stark reductionism. It is also a reminder that extending legal personhood to new cases often relies on our capacity to draw persuasive analogies that resonate with a community's shared beliefs and values and the actual AI activities in social and economic practice. And much like the philosophers grappling with the streetcar's operation, today's jurists face questions about the legal status of AI. What kind of "force" drives AI: is it purely human, artificial, or a blend? Yet, in the end, much like the streetcar dialogue, discussions of legal personhood tend to evolve from theoretical musing to pragmatic necessity—a pattern well illustrated by the historical development of corporate law, where abstract questions of personhood ultimately yield concrete needs for accountability and governance.

This chapter explores the evolving debate on AI legal personhood through a critical literature review, tracing current trajectories and emerging prospects. We argue that a complex web of three path dependencies is at the heart of such debate.

The first path dependency is rooted in prevailing views on legal personhood, whether clustered or singularist (Section 2). The second type is tied to technological advancement and accessibility (Section 3). The third path dependency bridges AI technology and the views on legal personhood. Emerging socio-digital institutions

[1] The same story is recounted in Paolo Zatti's book *Persone Giuridiche e Soggettività* (Zatti, 1975).

determine the social status of AI in different contexts (section 4). As AI systems master new domains—from visual perception to linguistic generation—these advances recalibrate our expectations and reframe discussions on AI's legal status. Our analysis suggests that these three path dependencies are interconnected and fluctuate over time. During times of technological optimism and commercial accessibility, the debate leans toward a cluster perspective, with arguments about extending a broader set of rights and responsibilities to AI akin to those of humans or corporations. Conversely, during times of skepticism or uncertainty about technological potential, discussions often reflect a singularist perspective, focusing on whether AI should be granted narrowly defined rights like those afforded to non-human animals or environmental entities.

Two additional strands of path dependency shape the debate on AI legal personhood: the influence of existing regulatory frameworks governing technology—such as data privacy, liability, and cybersecurity—and historical legal precedents (case law) for extending legal personhood to other entities, particularly corporations (Section 5). Regarding the first dimension, we will examine recent legislative proposals to grant legal personhood to AI systems and current AI regulatory frameworks, focusing on data privacy, liability, and cybersecurity. Regulatory frameworks can either facilitate or hinder the recognition of AI personhood, depending on the consistency of interconnected rules. Our analysis will conclude that, particularly within the European Union, these frameworks tend to constrain rather than catalyze such expansion, their interconnected rules forming a cohesive resistance to change. However, in the interdisciplinary debate, some voices are claiming that growing responsibility gaps create the need for conferring (at least partial) legal personhood to AI (e.g., (Lior, 2020, 1084 ff; Schirmer, 2019, 35; Turner, 2018, 100 ff.).

Concerning historical case law, we will argue that it provides a benchmark for assessing the feasibility of extending legal personhood to AI. Existing arguments frequently draw on the same criteria historically used to justify granting legal personhood to entities such as corporations, non-governmental organizations, minority groups, and, recently, communities of humans and nature in the global south through judicial interpretation or legislative action. However, given the limited empirical evidence available, we anticipate that courts will be hesitant to grant AI legal personhood in the absence of supportive legislation. Such recognition is unlikely unless AI systems first achieve *de facto* legitimacy by exercising rights and fulfilling societal roles over an extended period.

We shall conclude the chapter by exploring the near- and long-term prospects of AI development, distinguishing between incremental advancements in generative models and autonomous agents, which may result in the conferral of (partial) legal capacities over the next 5–20 years and more transformative possibilities, such as AI integration with human cognition through Brain-Machine Interfaces (BMIs), which could imply the legal personification of human-machine associations in the distant future (Section 5).

2. Historical, Social, and Legal Views of Legal Personhood

The term "persona" was initially used in ancient Rome to denote the masks used by actors in theatre to represent different characters and those characters themselves. It moved then into law to refer to the various roles that humans may undertake on the legal scene in substantive law (e.g., as debtors, creditors, or owners of property) or in procedural law (e.g., as plaintiffs or defendants) and then to denote the most abstract role, namely, the ability to participate in any kind legal interactions, vesting the corresponding roles.

In Roman law (for instance, in the Institutes by Gaius), the term "persona" applies to all human beings, divided into the two main subcategories of free and enslaved people. The idea is that in principle, abstracting from the specificity of municipal legal systems

(and having also regard to a universal natural law), any human can play any legal role, whereby a legal role we mean the sets of rights, duties, and powers that inhere in, and indeed constitute a particular legal position (as an owner, a debtor, a creditor, a plaintiff or a defendant, etc.). However, a different, more selective notion of a "persona" parallelly emerges, which focuses on the concrete ability to undertake such roles, an ability from which enslaved people were excluded in the positive Roman legal system, being considered sellable things rather than active participants in legal interactions.

As slavery was progressively abolished during the late Roman empire (and enslaved people, too, were recognized for some legal protection), the idea prevailed that all humans have, in principle, legal personhood. The notion of personhood was subsequently extended to collective entities, such as companies and associations, who could vest legal roles through the actions of their members and employees (organs). Thus, persons in law are usually divided into natural persons (human beings) and juridical persons (collective entities).

A second tradition of the legal person is rooted in Christological ideas. As symbolized by many medieval images of the crucifixion, a veil separates the mortal body of Jesus Christ from his immortal spiritual body and, at the same time, connects them. This idea was continued by the personification of the church, the state, and the formal organization (Kantorowicz, 1957). In the nineteenth century's rise of capitalism, economic organizations became efficient and powerful corporate actors, a development that their recognition has reinforced as legal persons (Horwitz, 1985). The usual identification of the ensemble of individual members and corporate entities has been completely abandoned, and a radical separation of the two has been realized. However, the person is not understood as a merely passive construct. Instead, an activity potential is ascribed to it, whose actions initially become effective in various social systems, including the legal system.

From a social perspective, inspired by systems theory, one may say that "personality came into being wherever the behaviour of others was imagined to be chosen and to be communicatively open to influence through one's own behaviour" (Luhmann, 2012/2013, 32). Thus, communications produce the legal person and, at the same time, convey the person's peculiar potential for activity (Teubner, 1988). Personification allows the law to "internalize" emergent non-human entities (organizations, algorithms, and human-nature associations) as quasi-actors, albeit not these entities themselves, but only as semantic artifacts, i.e., "persons". By saying that persons are semantic artifacts, we mean they result from a bundle of expectations and many norms directed at the person. These persons become, indeed, attribution addresses for legal norms. Moreover, legal persons trigger a new dynamic in which emergent phenomena outside the law, including AI, become fully-fledged communication partners within the law. They now participate directly in legal communication.

Finally, the internal legal communication with the new participants, in turn, generates external effects on the substrate. Mutual influences of internal and external processes develop, creating an independent co-evolution of the legal person, its AI substrate, and its activities in social institutions.

Let us now move from the social to the strictly legal perspective; namely, let us focus directly on the norms that are directed to legal persons, i.e., and correspondingly to roles (the rights, duties, and powers and clusters of them) that a person in law may possess or may acquire (roles that are not accessible to non-persons, e.g., things). In this regard, we may distinguish two views, which we call the singularist view and the cluster view. The *singularist view* adopts a minimal understanding: an entity qualifies as a legal person simply by holding, or having the capacity to hold, a single right or duty. This notion is used, in particular, in connection with the idea of a right as a legally protected interest to

ascribe legal personhood to entities incapable of taking the initiative to their own. Following this approach, given the existence of norms meant to protect non-human animals, fetuses, trees, or rivers, we should conclude that all those entities also have legal personhood.[2]

Another perspective, the *cluster view* (Kurki, 2019; Naffine, 2009; Ohlin, 2005), adopts a broader understanding: it assumes that legal personhood consists of vesting (or having the capacity to vest, given appropriate conditions) a large cluster of legal roles, such as, in the private law domain, the ability to make contracts and own property, protection against harmful behavior by others, the power to activate judicial proceedings and legislative action, as well as liability for own wrongful behavior. Such roles are typically attributed to all adult human beings[3], but legal personhood, in some instances, may be limited to a subset of these roles. Usually, children and incapacitated adults are persons in law, even though they are excluded from making contracts and starting judicial proceedings on their initiative (for this purpose, they need to be substituted or assisted by their guardians). Juristic persons, such as corporations and civil associations, on the other hand, can make contracts and sue (through the actions of their administrators) as well as claim constitutional protection for their activities in economic and social contexts. However, they are excluded from family roles, such as those of a spouse or a child, and from other legal positions, such as fundamental rights or data protection rights (according to EU data protection law). Therefore, the attribution of a cluster personhood is consistent with vast restrictions over this package, as in the case of minority and incapacity, or also, in particular legal systems, according to certain features of individuals, such as gender or social position (recent history has also unfortunately known situations in which individuals or groups have been stripped of any every aspect of personhood in law, being denied the "right to have rights", see Arendt 1966, Ch. 9). The cluster view interprets the meaning (or legal implications) of legal personhood as a collection of different statuses (clusters of possessed or accessible legal roles) allocated to certain entities according to the features the law assumes to be relevant to the attribution of such statuses. Such statuses are unified by reference to a typical case, namely the default cluster allocated to adult human beings; the other instances are treated as variations from this standard case.

The debate over AI legal personhood diverges depending on whether a singularist or cluster approach is taken. In the singularist, we need to consider whether the features of AI can or should be assimilated to those features that, in the case of other non-human entities, justify the attribution of single rights or duties (typically benefit-rights to them). For instance, if specific AI systems were assumed to possess sentience, an argument could be made to expand the protection against mistreatment currently granted to animals. Conversely, the cluster approach examines whether specific AI systems should hold legal roles that substantially overlap with the cluster assigned to humans or juridical persons, possibly with restrictions applicable to AI systems. Different approaches can be used to attribute the cluster content to AI systems. Suppose AI systems are viewed similarly to minors or legally incapacitated humans. In that case, they might receive protection against harm and eligibility for certain benefits but would lack independent capacity to enter contracts or engage in legal proceedings. However, if they are treated like corporations, AI would have limited protections but could be granted a general capacity to contract and initiate lawsuits.

The distinction between singularist and cluster approaches can be related to the above-mentioned social approach to personhood. Let us recall that, according to the social

[2] A key issue with this view is that it does not align with practical realities and common beliefs, as these entities are generally not regarded as legal persons in practice (Kurki, 2019).

[3] More specifically, to all adult citizens of sound mind.

approach, being a person means being considered a partner in communications, i.e., someone seen as capable both of producing meaningful utterances that others can understand and of interpreting the utterances produced by others. Following this idea, we may say that an entity is considered a (social) person by the law (a) where it is granted the power to make legal communication, i.e., legally binding declarations (e.g., contracts and other juristic acts) as wells as legally relevant factual statements (e.g., testimonies or confessions), but also (b) where it is the addressee of legal obligations (it must be assumed to understand commands in order to be able to comply with them). Thus, we may say that the law only grants social personhood to an agent when it confers it a cluster-personhood, including duties and powers; conversely, the law does not grant social personhood when it only establishes legal protection of an entity (only views it the bearer of a "legally protected interest"). In the latter case (e.g., a forest, a mountain, an animal), the entity is protected by the law, but no communication originating from or directed to it is legally recognized.

3. The Development of the Debate

The recognition of legal personhood to AI systems —especially the cluster approach, which makes them active legal agents— is still the object of an open debate. A clear positive answer could be provided if AI systems had achieved general human-level capacities, i.e., if their cognitive skills, social attitudes, and abilities were on a par (or superior) to those of humans or human-managed corporations. However, this is not the case: humans and AI systems differ in many ways (Floridi 2024 Ch. 2), and no uncontroversial criterion is available to determine whether, given such differences, the law should assimilate, or rather distinguish AI systems from, humans or corporations (the entities which already enjoy cluster legal personhood). Even when a single feature is considered, such as rationality in decision-making or sentience, what ultimately matters is the level of abstraction at which this feature is analyzed, as this determines which observable traits are deemed relevant and whether they can provide sufficient justification. For example, suppose we limit rationality to the ability to engage in some elementary form of planning or pattern recognition and sentience to the ability to react appropriately to specific wanted or unwanted inputs. In that case, one may reasonably argue that humans and some AI systems equally possess these capacities. A different conclusion would be reached if more demanding concepts (and corresponding levels of abstraction) were adopted.

The debate on AI's legal personhood is also shaped by the choice between two perspectives: existing law (*de lege lata*) and potential legal reform (*de lege ferenda*). The *de lege lata* approach assesses whether current laws already recognize, or could reasonably be interpreted to recognize, some degree of legal personhood for AI systems. In contrast, the *de lege ferenda* perspective considers whether new laws should be enacted to grant legal personhood to AI explicitly. Both approaches evaluate the justification for and against recognizing AI personhood, using normative criteria to guide the rationale for such a designation. Rationales may be distinguished in non-instrumental and instrumental. A non-instrumental rationale suggests that some specific AI systems deserve legal personhood based on their intrinsic characteristics, viewing them, in Kantian terms, as "ends in themselves." For instance, this view might argue that AI systems capable of rational thought should receive the protections granted to all rational beings or that AI systems capable of experiencing suffering should be protected similarly to other sentient entities. In contrast, an instrumental rationale supports granting legal personhood to AI not for its own sake but for its benefits to human interests — such as those of people who rely on AI in business or society (Novelli, 2023). Here, legal personhood for AI is seen as a tool to support human goals rather than as recognition of

any inherent value in the AI itself. However, the instrumental rationale is open to the distinction between AI as a simple tool and AI as an agent within a principal-agent-relation where the agent is supposed to realize the principal's instructions with a certain amount of discretion. In the following section, we shall consider the historical evolution of the debate on legal personhood.

3.1. Early Analyses on AI personhood

Speculations about machines possessing human-like qualities have captivated thinkers throughout history, with roots traceable to ancient myths like Pygmalion and Galatea. Yet, our focus is limited explicitly to the relationship between currently available AI and legal personhood. One of the earliest discussions of the legal implications of human-like beings, albeit indirectly, can be found in Tuchler (1978), where the concept of the "fabricated man" is introduced, a term inspired partly by science fiction and applied to entities such as children conceived through reproductive technologies, embryos grown outside the traditional womb, cyborgs, and robots. Tuchler raises concerns about how these "fabricated beings" might affect societal views on the rule of law. He warns that denying personhood to human-like beings could cause a rift between the legal framework and public moral intuitions, potentially leading to cynicism, disobedience, or an erosion of respect for legal norms.[4] At the same time, he cautions that extending rights and duties to such entities might undermine humanity's sense of inherent value. Although Tuchler remains noncommittal, he emphasizes the dangers of defining personhood too rigidly, as it may perpetuate exclusion and discrimination — critiques that continue to challenge essentialist views of legal personhood.

However, the real growth in legal scholarship on legal personhood for AI began in the 1980s, as evidenced by searches on Google Scholar using keywords such as "legal personhood/personality," "artificial intelligence," "robots," "legal rights," "computers," and queries combining these terms, like "legal personhood [or personality]" AND "artificial intelligence," "artificial intelligence legal rights," "robot personhood," "legal status of autonomous systems," and "computational agents in law."

Early legal writings on AI did not approach the question of granting legal personhood to AI systems in a comprehensive manner. Instead, they adopted a bottom-up approach, exploring whether certain rights or bundles of rights and duties — typically intellectual property rights and tort liabilities — could be attributed to AI systems (in a singularist fashion). These more focused discussions would connect indirectly to the broader debate on AI and legal personhood. This progression mirrors what some legal theorists call an "eliminativist" or "inferentialist" view of systemic legal concepts like legal personhood, which states they are best understood as mere nodes between factual preconditions and normative consequences (Ross, 1957; Sartor, 2009). Anyway, such an incremental, bottom-up method may offer a more pragmatic solution compared to later top-down approaches, which ask more generally, "What happens if we grant legal personhood to AI?".

So, to provide some examples of papers of this type, Butler (1981) explored whether a computer can be considered an author under copyright law (Butler, 1981). Butler discusses how AI can produce novel content with minimal human input, challenging existing notions of authorship and copyright. The possibility of attributing authorship rights directly to an AI system is raised, which, if accepted, would imply a form of legal

[4] In contrast, Shapiro (1982), in *Of Robots, Persons, and the Protection of Religious Beliefs*, uses a comparison to argue that individuals can undergo such profound transformation that they effectively cease to be persons and become akin to "robots," losing their capacity for autonomous decision-making (Shapiro, 1982).

personhood for the machine. However, Butler ultimately finds the idea conceptually and legally problematic due to its complications in allocating legal responsibility and authorship rights.

Similarly, Michael Gemignani's (1983) "Laying Down the Law to Robots" addresses robot autonomy's legal and ethical challenges, questioning their role in human-like functions such as judging in criminal justice and creating intellectual property (Gemignani, 1984). He explores who should own the rights to AI-generated works—programmer, user, or machine—and suggests revisiting copyright frameworks as AI creativity increases. However, Gemignani also examines liability for robot-caused harm, debating whether robots should be treated as products under strict liability or require new legal standards. Though not advocating for AI legal personhood, both papers laid the groundwork for modern debates on AI's legal status, which revolve around authorship, liability, and decision-making.

Taking a more comprehensive approach to the question of AI legal personhood, Willick, in his 1983 and 1985 papers, explored the potential for AI to be recognized as "persons" under American Constitutional law (Willick, 1983, 1985). He argued that legal personhood has evolved to encompass a broader range of entities and questioned whether computers could be included, mainly as they increasingly exhibit human-like intelligence. Willick parallels the historical recognition of other groups as legal persons, such as blacks, women, and corporations, suggesting that AI could follow a similar trajectory. He envisioned AI achieving personhood by demonstrating capabilities beyond "mere machines". He even introduced the concept of "partial personality", where AI might be recognized as a person for specific legal purposes (like enslaved people). Willick framed the possibility of AI legal personhood as not an immediate reality but a potential future development contingent upon technological progress and societal acceptance.

3.2. The 90s and 2000s

The 1990s saw more in-depth studies and analyses on legal personhood and AI. Two significant papers stand out.

The first, while not directly addressing legal personhood, is one of the earliest comprehensive examinations of the legal status of AI systems under tort law by George S. Cole (Cole, 1990). As previously noted, legal personhood and liability histories are closely linked in legal literature. Cole's paper primarily focuses on how existing tort liability frameworks — such as product liability, service liability, negligence, and malpractice — can be adapted to account for harm caused by AI and expert systems. Although Cole does not argue that current laws are sufficient, his discussion on the potential liability of AI systems under tort law raises the question of whether AI might require some form of legal recognition beyond being classified as mere tools or products.

Cole's analysis suggests that the autonomous functioning of AI — its ability to make decisions and interact with the natural world — may signal the need for a new legal category that moves beyond treating AI as mere property or service providers. Nevertheless, in a footnote, Cole rules out the possibility of recognizing AI as a distinct legal entity, mainly due to the technical challenges in developing truly autonomous AI — capable of learning, adapting, and achieving consciousness (Cole 1990, 154).

The second one is Lawrence Solum's 1992 essay, "Legal Personhood for Artificial Intelligences," widely regarded as foundational in the legal-theoretical exploration of AI and legal personhood (Solum, 1992). Lawrence Solum uses two thought experiments to explore the legal implications of AI personhood.

First, could an AI serve as a trustee? While AI might handle technical tasks —such as purchasing insurance to cover potential breaches of duty or liabilities, it could face as

a trustee — Solum raises two fundamental objections: (1) trustees must be held accountable for negligence or wrongdoing (responsibility objection), and (2) AI, given its current limitations, such as the "frame problem," cannot handle unforeseen circumstances and moral dilemmas that require human judgment (judgment objection).

The second thought experiment considers whether AI could claim constitutional rights. This scenario envisions a future where AI demands individual rights, such as freedom of speech or protection from involuntary servitude under the Thirteenth Amendment. Solum argues that constitutional personhood raises different questions than trusteeship, focusing on competence and qualities like intentionality, consciousness, and moral worth. He concludes that while legal personhood has historically been granted to non-human entities like corporations, AI's lack of moral responsibility and human-like intentionality remains a significant barrier to its full recognition as a legal person.

However, the most critical aspect of this essay is that it does not aim to resolve the question of AI personhood. Solum explicitly advocates using legal contexts as a pragmatic approach to evaluate theoretical claims and foster progress (Solum 1992, 1223). He emphasizes that the legal system introduces a sensible approach that abstract philosophical debates often lack, as practical consequences and societal needs drive legal decisions. Instead of debating abstract questions like whether AI can "think," Solum asks more grounded, valuable questions, such as whether AI could competently serve as a trustee, manage complex financial trusts, or fulfil legal duties. With its formal, public nature, the legal system provides a platform where these arguments can be tested, scrutinized, and debated within a broader societal framework.

Until now, much of the scientific debate on legal AI personhood has focused on symbolic AI and expert systems. However, in the 2000s, the discussion shifted towards different AI technologies, broadly classified under "statistical AI," with approaches such as Machine Learning (ML). Although these technologies had long been known in computer science, they only entered the legal debate during this period, partly because of their increased performance and commercial success. For a time, statistical AI and ML appeared to revolutionize the field, as these systems were seen as more human-like in the ways they learned, processed information, and operated. This shift sparked renewed interest in the legal personhood of AI, significantly impacting both legal scholarship and policy, as we will explore in the next section.

In contrast to earlier discussions, this period saw the legal debate on AI personhood evolve beyond theoretical questions of liability and constitutional statuses for human-like AI systems or Artificial General Intelligence (AGI). The focus narrowed to more concrete, artificial agents capable of autonomous interaction with their environment, adaptation, and communication with humans and other synthetic agents. Advancements in ML and related adaptive technologies largely drove this shift. This raises several legal challenges, including AI's capacity to enter contracts, the ability to pay income taxes like social security contributions or the VAT, and even AI's potential to commit crimes (Andrade et al., 2007; Chopra & White, 2011; Dahiyat, 2007; Hallevy, 2010; Karnow, 1994; Oberson, 2017). This era is characterized by a more optimistic view of granting legal personhood to AI (Allgrove, 2004; Asaro, 2007; Hallevy, 2010; Hubbard, 2010). Yet, even during this period, some legal scholars maintained that AI should be treated like any other product (Bryson et al., 2017), with (strict) liability falling on the humans who create or use them (Vladeck, 2014). They argued that human accountability creates a stronger deterrent against harmful AI behavior. For cases where no specific human can be held directly responsible, they proposed mandatory insurance to cover potential damages (Solaiman, 2017), which is an indirect recognition of an agency in need of insurance.

It seems, therefore, that the trajectory of the legal debate on AI personhood mirrors the trends in technological advancement, reflecting the alternating cycles of optimism ("summers") and scepticism ("winters") that have historically shaped the field of AI. However, another critical predictive factor is the policy landscape. Notably, if we were to identify a fourth and most recent wave in this discourse, we could place it around 2017, when two policy outputs occurred, as discussed in the next section. Following these events, Google Scholar data from 2018 to 2024 shows a notable increase in scholarly publications on the topic. Further confirming this trend, seminal works such as Solum's paper, which had a steady citation rate until 2017, experienced a sharp rise in citations starting in 2018, effectively doubling its citation count.

This most recent wave shows some standard features. The topics covered are mostly the same and with a bottom-up approach – e.g., criminal liability, contract law, tort law, ownership (Brown, 2021; Simmler & Markwalder, 2019) – but with a more significant number of scholars and scientific perspectives, with ethics, public policy and social sciences gaining an important role (Gordon, 2021; van den Hoven van Genderen, 2018), advocating for more inter-disciplinary research (Kostenko et al., 2024). This period has also seen the emergence of empirical studies examining public attitudes toward AI rights and legal personhood (Kouravanas & Pavlopoulos, 2022; Martínez & Winter, 2021), as well as statistical analyses of court decisions regarding legal personhood (Banteka, 2020).[5]

The scientific output during this period is exceptionally diverse, encompassing analyses of concrete real-world scenarios — such as AI in the workplace, economic transactions by AI, potential discussions on concrete citizenship rights, and public policies (Jaynes, 2020; Kornilakis, 2023; Nowik, 2021; Zech, 2021) — and more theoretical works on legal and social agency. Theoretical contributions explore legal personhood as a spectrum of possibilities varying in intensity and degrees of legal status (Mocanu, 2022; Schirmer, 2020). Others propose dialogical solutions based on reflective equilibrium (Novelli et al., 2022), while others use AI to construct thought experiments that challenge and expand the boundaries of legal personhood (Chen & Burgess, 2019). Finally, there are attempts to explain legal and social personification as compensation for the mutual inaccessibility of the elementary operations of emergent systems, particularly social communications and AI calculations (Teubner, 2025).

In any case, a notable trend in this period is a certain pessimism toward granting broad legal personhood to AI, often driven by critiques of concrete policy proposals supporting such recognition (Banteka, 2020; Birhane et al., 2024; Chesterman, 2021; Floridi & Taddeo, 2018; Pagallo, 2018; Ziemianin, 2021). However, within this discourse, the less pessimistic perspectives propose pragmatic approaches to address the legal challenges posed by AI, focusing on alternative mechanisms to achieve similar objectives. They often involve leveraging corporate governance structures, where operating agreements could theoretically allow autonomous systems, like AI, to take legally recognized actions on behalf of a company (Bayern et al., 2017). Additionally, there are varying degrees of support for more moderate, possibilist perspectives for AI as legal persons, which frequently argue that decisions about AI legal personhood should be based on broader socio-political considerations rather than strictly legal criteria (Brown, 2021; Dremliuga et al., 2019; Beckers and Teubner, 2021; Gunkel, 2024; Jowitt, 2021; Wojtczak, 2022).

[5] Specifically, the authors found that most people are not in favour of granting AI the same legal protections as humans, corporations, or other entities. The study also revealed a significant difference in opinion between liberals and conservatives, with liberals being more likely to endorse legal protection and personhood for AI.

4. The Participation in Socio-digital Institutions

Another key pattern of the debate on AI's legal personhood is its participation in social and digital institutions—a topic widely explored by various scholars. These scholars argue that legal personhood can only be fully understood when its reliance on personification beyond the legal framework is recognized. Thus, a clear distinction between personification in law and other social contexts must be made.

Social personification, economic personification, and legal personification of AI are independent processes but influence each other massively simultaneously. Various theoretical approaches analyse how autonomous algorithms are reconstructed as social persons in the form of semantic artefacts, not only in the legal system but also in various social systems, especially in politics and the economy. These approaches are developed in information philosophy (Misselhorn, 2015, 3 ff.; Thürmel, 2015, 52 ff; Floridi and Sanders, 2011, 187 ff.), moral philosophy (Coeckelbergh, 2012, 35; Allen et al., 2005), sociological systems theory (Esposito, 2017; Baecker, 2011, 17.), actor-network-theory (Rauer, 2024), political theory (Cohen, 2019, 221 ff.), and regulation studies (Krafft et al., 2022, 120 f.). Already today, these authors claim that, in various social systems, autonomous algorithms are personified, i.e. made into communication partners as social actors. Each social system creates its persons with their own characteristics (Boyle, 2023, 235).

How does legal personification depend on social personification? When social communication "institutes" non-human entities into new social quasi-actors, an almost irresistible institutional pressure on the law arises to "constitute" their (limited or full) legal personhood (Vesting, 2023). As soon as social practices treat organizations, algorithms, or other non-human entities as actors, legislation and courts have a considerable burden of argumentation if they want to deny them legal capacity. At present, autonomous algorithms are effectively institutionalized as market actors in principal-agent-relations concluding contracts between the principal and a third party (Chagal-Feferkorn, 2018, 113.). In addition, economists observe that algorithms frequently create typical agency problems of disloyalty toward their principal (Zekos, 2021, 139 ff.). The law is under pressure to develop countermeasures against such agency problems. Moreover, once increasingly tasks of contract performance are delegated to autonomous software agents, responsibility gaps open and will widen in the future (Chinen, 2016), 363). This pressures the law to recognize their (partial) personhood *de lege lata* in contract and liability law. Suppose that, in the future, algorithms will be used in social practice to act as self-interested units. No doubt, an extension of their limited legal capacity will have to be considered from a functional point of view (Dahiyat, 2021, 83 ff.; Lior, 2020, 1100 ff; Koops and Jaquet-Chiffelle, 2008, 70). As soon as profit-oriented algorithms enter the scene, economic practice will create pressures for their full legal personhood (Dahiyat, 2021, 83 ff.; Lior, 2020, 1100 ff.). The law will have to designate autonomous algorithms as legal persons because other social systems "demand" it to stabilize their social actors' identities.

4.1. Risks of Socio-digital Institutions and Legal Personification

Many authors undervalue the crucial interactions between technology and social institutions. Instead, they connect the technological characteristics of computers directly to legal rules. Thus, they remain locked in inadequate models of linear causation and simplified normative implications. An alternative model starts with a typology of machine behaviour developed in technology studies (Rahwan et al., 2019) and combines this with an analysis of the role socio-digital institutions are playing in mediating between technological properties and legal rules (Wielsch, 2018, 961 f.).

Socio-digital institutions are stabilized complexes of social expectations, particularly expectations about the social behaviour of algorithms and related risks, which come up regularly when social systems respond to new digital technologies' affordances.

Such socio-digital institutions emerge from three fundamental types of human-algorithm contacts (Rahwan et al., 2019, 481): (1) individual machine behaviour denotes individually delineated algorithmic operations that humans can understand through communication in the strict sense; (2) hybrid machine behaviour occurs in densely intertwined and stable interactions between humans and machines; here, a human-machine association emerges as a new collective actor; (3) collective machine behaviour indirectly links humans to the interconnectivity of invisible machines. These contacts create different risks in socio-digital institutions and require differential legal status for AI.

Socio-digital institutions are not creations from nothing (*creationes ex nihilo)*; instead, they are already rooted in existing social institutions of the offline world, which are then fundamentally transformed by the 'invasion' of algorithms. The first type of socio-digital institution builds on traditional human principal-agent relations when humans delegate tasks no longer to humans but to computers. The second type originates in hybrid inter-human associations and becomes a new collective actor. The third type builds on the traditional human exposure to machines that connect to society indirectly, now through new autonomous 'invisible machines.' Each socio-digital institution develops its own risks co-produced by computer technology and social relations. The risks of 'digital assistance' are realized when tasks are delegated to single algorithms, the risks of 'human-machine associations' when humans and algorithms together form a collective actor, and the risks of 'digital interconnectivity' when social communication is only indirectly coupled to a crowd of interacting algorithms (Taylor and De Leeuw, 2020).

As intermediary disciplines between IT studies and legal doctrine, the social sciences analyse the co-evolutionary dynamics between technological advancements, socio-digital institutions and legal regimes (Chinen, 2016). According to the principle of 'transversality', developed in philosophy and sociology (Grundmann et al., 2021, 1 ff.), relevant insights come from various social sciences, particularly from their contributions to the personification of algorithms, emergent properties of human-algorithm associations, and distributed cognition of interconnected algorithms.

'Digital Assistance': Individual machine behaviour, as analysed in IT studies, refers to the intrinsic properties of a single algorithm, whose dynamics are driven by their single source code or design in its interaction with the environment (Rahwan et al., 2019), 481. These technical properties alone do not yet determine whether or not algorithms can be qualified as autonomous actors. Instead, within socio-digital institutions, it will be decided whether algorithms will have the social status of mere instruments, be agents in principal-agent relations, or become – as a potential future development – independent self-interested socio-economic actors.

If the delegation of tasks from a human actor to an algorithm creates two independent streams of social action, a principal-agent relation appears between them. Such principal-agent relations presuppose social personhood for both the principal and the agent. Thus, a selective attribution of personhood to specific digital processes is needed. Several social theories provide analytical frameworks for understanding the complex social process of algorithm personification.

Sociological theory conceives personification as a performative act that institutes the social reality of an actor. In a complementary way, Actor-Network Theory defines the interactive qualities that transform an algorithm into an 'actant', which is different from a human actor (Latour, 2004, 62 ff.). Information philosophy defines the conditions under which algorithmic actions are determined as autonomous or non-autonomous (Floridi and Sanders, 2011, 192 ff.). Social systems theory analyses in detail, how, in a situation of double contingency, the emergent communication of human principals with algorithmic agents defines the algorithm's social identity and action capacity (Esposito, 2017). This does not happen everywhere; instead, each social context creates its criteria of personhood for algorithms. Different social systems attribute various actions, rights and obligations to algorithms as their 'persons' and equip them with specific resources, interests, intentions, goals, or preferences. Political philosophy describes in detail how in a 'representing agency' relation, the transfer of the vicarious power (*potestas vicaria*) constitutes the vicarious personhood of algorithms, 'implying distinct risks and dangers haunting modernity' (Trüstedt, 2020, 196 f.).

Via social personification, technological risks are transformed into social risks. Causal risks stemming from the movement of objects are now conceived as action risks arising from the disappointment of Ego's expectations about Alter's actions. Thus, in 'digital assistance' situations, typical communicative risks of a principal-agent relation will appear, which differ from those of an instrumental subject-object relation.

Once this socio-digital institution exists, the law must decide, according to its criteria, what degrees of legal personhood it attributes to the digital actants. For the autonomy risk of digital assistance, an answer may be to grant software agents the status of limited legal personhood (e.g., Schirmer, 2019, 35). The algorithms' decisions are legally binding for their principals and give rise to liability consequences. The algorithms' limited legal subjectivity enables them to conclude binding contracts for others as a proxy (e.g., Kovac, 2020, 112 ff.; Powell, 2020, 329). For contractual and tortious liability, they need to be recognized as vicarious agents so that the agent's misconduct itself (and not merely the conduct of the principals behind it) constitutes a breach of duty for which the principals must be held responsible (e.g., Sartor 2009, 275 ff, Abott, 2018, 22 ff.). Punitive sanctions (exceeding compensation from harm) may be applied to deter autonomous agents from engaging in criminal activities (Nerantzi and Sartor 2024).

Since liability rules coping with action risks of digital actants differ substantially from rules reacting to causal risks of mere objects, strict liability rules for industrial hazards and product liability rules are inadequate. Instead, in the digital principal-agent relation, rules of vicarious liability for the actant's decisions are needed. Out of various potentially liable actors — programmers, producers, dealers, operators — the vicarious liability rules exclusively target the actor who has delegated a task and thus set the risks of the algorithm's autonomous decisions. For the particular risks of delegation, it is, therefore, only the user/operator who is responsible when things go wrong.

'Digital Hybridity': Quite different are the social sciences' contributions, in particular those of the actor-network theory (Latour, 2004, 70 ff.), dealing with hybrid human-machine associations. Due to closely intertwined interactions between algorithms and humans, they develop risks that differ qualitatively from the risks of individual action within digital assistance. Digital hybridity has to deal with transforming single human-

algorithm interactions into collective actorship (Rauer, 2024, 484 ff.). Most conspicuous are constellations of dense interaction, in which responsibility for actions can only be established for the whole hybrid entity, while it cannot be established for the individual algorithm or human involved (Pettit, 2007). For these risks, vicarious liability is of no help. Instead, the law needs to develop liability rules for human-machine collectivities, which, however, are below the liability threshold of a full-fledged legal person.

The wrongful action is attributed to the emerging human-algorithm association, and liability is channelled toward many actors behind the digital hybrid. A network of different actors initiates a dense human-algorithm interaction and profits from its results. Since control is dispersed among the network nodes, responsibility follows this specific risk structure. For human-machine associations, a fully developed corporate liability of the association cannot be established, at least for the time being. Instead, the principles of enterprise liability are well suited to shape the responsibility of digital hybrids (Vladeck, 2014, 149; Allain, 2013, 1074). Enterprise liability works in two steps. In the first step, the wrongful action is attributed to the hybrid as a collective without disentangling the contributions of humans and algorithms. In the second step, liability for the collective action is channelled to all the network nodes. As a result, all the network nodes are liable according to benefit and control. If a hub enterprise contractually coordinates the network, primary liability should fall on this hub, usually the producer, who can take recourse on the network nodes.

'Digital Interconnectivity': In contrast to the other two constellations, collective machine behaviour refers to the systemwide behaviour resulting from the interconnectivity of machine agents. It is their specific risk that no single principal or agent can be identified. Neither are algorithmic interconnectivity risks identical to human-machine associations' risks. We encounter heterarchical interconnected processes between algorithms, not communication between humans and algorithms. Algorithmic interconnectivity can be understood as a restless collective, qualified by distributed cognition (Rammert, 2012, 95 ff.

Such a 'collectivity without collective' cannot be described as a deliberately designed network but simply as a crowd of algorithms. Regarding how society relates to such algorithmic crowds, social theory qualifies them as 'invisible machines' (Luhmann 2012/2013, 66; Hildebrandt, 2015, 40). There is neither direct communication between an isolated algorithm and humans nor a collectivity combining humans and algorithms. Interconnectivity between different algorithms influences social systems so that not one-to-one connections are at work but a more diffuse structural coupling between algorithmic interconnectivity and human communication. As a result, this situation excludes legal liability for one among the various algorithms. Instead, fund solutions require 'political' decisions of regulatory agencies to define the responsible industry sector. Neither beneficiary nor contributor of the gain is identifiable. Setting up liability funds financed by the industry sector is an adequate solution (Erdélyi and Erdélyi, 2020). The contributions of the relevant actors should be calculated according to their market share and problem-solving capacity. The rules must be oriented to compensation, precaution, and the broader social implications of interconnectivity damages. Recovery action as an additional principle of liability laws is required.

The specific risks of the new socio-digital institutions — autonomy, hybridity, interconnectivity — require treating the ascriptions of the algorithms' legal status differentially. A full legal personification of software agents, human-computer associations or multi-agent systems is excluded. Instead, in response to each of the three, risks, the legal status of algorithms needs to be carefully calibrated to the substantial role they play within their socio-digital institution.

For the autonomy risk of digital assistance, the correct answer is to grant software agents the status of limited legal personhood. The appropriate response to the association risk of digital hybridity is to give software agents the legal status as a member of a human-machine association. *De lege ferenda* actions, rights, obligations, and financial liability should be attributed to the hybrid association itself. This solution would break entirely new ground in private law. Finally, the answer to the interconnectivity risks is a 'risk pool', which is a collective unit without legal personhood. Liability law has to define its limits authoritatively. The unlawful behaviour of the pool itself would be the basis of liability.

5. From Law in Books to Law in Action: Legislative Attempts and Judicial Uncertainties

Though actual court decisions and legislation remain limited, the debate has moved from theory to judicial and policy proposals. The only formal conferral of personhood to AI occurred in 2017 when Saudi Arabia granted citizenship to Sophia, a humanoid robot developed by Hanson Robotics. However, this move was largely symbolic, with no concrete implications regarding rights enforcement. As a result, Sophia's citizenship has been viewed more as a political choreography to promote the growing social robot market rather than a substantive declaration regarding robot personhood or artificial intelligence (Parviainen & Coeckelbergh, 2021). More indirectly, courts have recognized algorithmic agency, when they declared contracting by algorithms as valid. They constructed them either as human declarations despite of human non-interference. Or they treated the algorithms as mere messengers, although the discretion granted to them went well beyond those of messengers and were clearly in the realm of agency law.

Some months earlier, a more influential legislative discussion on AI's legal status emerged from the European Parliament's 2017 Resolution on Civil Law Rules on Robotics. This resolution proposed a regulatory framework for AI and robots, suggesting the possibility of granting "electronic personhood" to specific advanced autonomous AI systems (59, let. f). This proposal addressed liability issues, specifically, whether an AI system could be held financially accountable for damages or harm caused by its autonomous decisions, particularly in cases where the system's creators or operators could not reasonably be held responsible. The proposal raises the question of whether the legal system should create a new category of legal personhood to handle these complexities.

The EU Parliament's "electronic personhood" proposal received mixed reactions, influencing policy discussions in places like the UK[6], but it largely failed to gain support. [7] While some authors welcome the proposal to close ever-growing accountability gaps often cited as justification for electronic personhood in those cases when the humans involved have fulfilled all their duties (Hage, 2017, 70 ff.; Vladeck, 2014, 150), critics argue that the accountability gaps are overstated (Chesterman, 2020, p. 825). Also, they generally contend that granting legal personhood to AI could serve as a shield for manufacturers and developers, allowing them to evade responsibility for the actions of AI systems (Bryson et al., 2017, p. 287). While similar concerns exist in corporate law — where the corporate veil can be pierced to hold individuals accountable — the justification for this in the case of AI is less clear. Legal personhood is not necessarily

[6] A Select Committee on Artificial Intelligence was appointed by the House of Lords on 29 June 207; its report is readable here: https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf. =

[7] In an open letter, 156 AI experts from 14 countries explicitly opposed this proposal: https://www.politico.eu/wp-content/uploads/2018/04/RoboticsOpenLetter.pdf.

combined with limiting liability to the legal person. In contrast, legal personhood may also increase the number of liable actors. Corporate personhood often facilitates investment and entrepreneurship, which applies to e-persons endowed with own assets or mandatory insurance. Of course, in AI systems, everyday purposes, interests, or joint activities among stakeholders are challenging to identify.

Scepticism about the EU Parliament's resolution is echoed in the findings of the Expert Group on Liability and New Technologies, appointed by the European Commission.[8] In their report on AI liability, the group underscores the necessity of holding human operators, users, and manufacturers accountable, especially when AI systems pose significant risks. They advocate for strict liability for high-risk AI, assigning control-based responsibility, and establishing negligence liability for low-risk technologies. Autonomous AI users should face the same accountability as if a human-caused harm. Manufacturers should be liable for defects, including those from post-market changes under their control, while compulsory insurance for high-risk AI could improve victim compensation. To support victims, the Group recommends simplifying proof requirements and enforcing data logging, with accountability shifted to operators when logs are missing. In short, the Group opposed AI's legal personhood, keeping responsibility with people and entities involved.

The fate of this proposal was arguably sealed by the recent regulatory framework in Europe, including the AI Act, the reform of the (reformed) Product Liability Directive (PLD), and the proposed Artificial Intelligence Liability Directive (AILD). This regulatory triad reinforces a fundamental principle emphasized by legal doctrine since 2017: AI is a product, not an entity deserving of an autonomous legal status. Thus, its design, development, and use must be strictly regulated, with precise standards and conventional liability mechanisms enforced. If those standards are not met, sanctions are imposed on developers or users according to risk thresholds inspired by a precautionary principle. Regardless of its strengths and weaknesses, this classification opens a path for the insurance industry to handle risks and cover damages caused by AI systems, as long as developers and users comply with the minimum standards of quality and transparency necessary for the commercialization and use of these technologies.

Nevertheless, the EU regulatory framework is far from perfect. Strict liability is unsuitable for AI-failures for two reasons (Chinen, 2016, 363; Allain, 2013, 1061 ff.). On the one side, it goes too far, opening the infamous liability floodgates, since strict liability is not limited to unlawful behavior and applies even when the AI-behaviour is perfectly lawful. On the other side, it goes not far enough since it compensates only bodily injury and material damages and excludes immaterial damages, particularly for violating personhood rights and unfair competition. However, These immaterial damages are frequent in AI-failures, while material damages are rare. Moreover, negligence liability of humans opens a considerable liability gap in those cases of algorithmic failures when human negligence is absent. No duty of care is violated when the electronic agent has acted unforeseeably (Ebers, 2021, 215, para 60; Selbst, 2020, 1322; Turner, 2018, 90 f.).

Considering these factors and the apparent lack of major technological shifts in the near term, one may anticipate that the EU policy debate on AI legal personhood and concrete legislative proposals will remain largely inactive in the coming years. This does not preclude the possibility of courts directly conferring legal personhood to AI through judicial decisions. The judicial response to such issues is uncertain. Still, it is not excluded, especially in complex cases where an AI might act outside its intended scope (*ultra vires*) or operate distributed across multiple systems, lacking a clear point of control

[8] You can read the report here: https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&do=groupDetail.groupDetail&groupID=3592.

(Forrest, 2024). The uncertainty about judicial behavior, combined with the flexible content of legal personhood — which lacks a precise set of defined rights and duties (Section 2) — suggests that courts will likely proceed incrementally, addressing cases individually rather than issuing sweeping rulings. The courts will instead confer only limited legal capacities, like the capacity to contract as an agent for a principal. Or they will apply not direct liability of AI-agents as e-persons, instead, vicarious liability in contract and tort for unlawful behaviour of the AI-agent. Thus, initial cases are expected to centre around liability, intellectual property (as already seen in Thaler v. Commissioner of Patents, aka DABUS), and consumer protection. The broader question of AI personhood may only come into focus as AI demonstrates more advanced, potentially sentient capabilities. In line with prior personhood cases, the judicial approach will likely reflect a cluster rather than a singularist approach.

Early rulings on AI's legal status will likely originate from local or district courts, allowing judges to establish factual records and frame the legal and ethical questions for consideration by higher courts (Forrest, 2024). Appellate courts, including the Supreme Court in the U.S., the Corte Costituzionale in Italy, or the German Constitutional Court, may later offer interpretations that set different national standards. While district courts may show flexibility in granting protections or status to AI, a final determination on AI legal personhood at the appellate court level is likely to be more conservative in the case of Italy and more progressive in the case of Germany.

All this has been pointed out by Katherine B. Forrest, who has also argued that, within the U.S. legal system, one possible route for conferring such protections lies in the Equal Protection Clause of the Fourteenth Amendment, which has historically been instrumental in expanding rights to previously marginalized groups (Forrest, 2024, p. 1027). This coincides with other authors who argue for constitutional protection of AI activities in science, art, and the economy, relying more on an institutional interpretation of fundamental rights than on individual protection.[9]

Suppose we were to assess the likelihood of a direct judicial conferral of legal personhood to AI shortly. The recent empirical data on U.S. case law regarding how courts determine legal personhood for artificial entities (Banteka, 2020) suggests this outcome is unlikely. However, courts in other jurisdictions may rule the other way around. The absence of any statutory foundation explicitly or implicitly supporting AI legal personhood may be a significant barrier, as the data show that the primary condition for conferring personhood in the U.S. is whether it is statute-based (45%). While American courts typically look to statutory language and legislative intent to determine whether an artificial entity qualifies as a legal person, this is different in other legal systems. As shown in various legal precents, German courts allow for more judicial activism in conferring legal personhood to non-human entities, which could be extended to AI.[10] Without legislative support, they personified legal partnerships, since they recognized them as functional equivalents to corporations. And they endowed labour unions and other associations with legal personhood, although legislation had explicitly excluded their legal personification. Another recent development is the global south where rivers like the Ganges or the Amazonas had become personified, and the courts developed remarkable judicial activism (e.g., O'Donnell and Talbot-Jones, 2018).

The same empirical analysis by Banteka indicates that the "right to sue and be sued" is the second most frequently cited condition (15%) for legal personhood. This requirement, particularly in the context of an AI entity actively suing others, poses a

[9] In Germany, there is a lively debate on the constitutional protection of AI activities in different social fields, e.g., Kersten (2019, 437 ff.; Gruber (2015, 193 ff.).

[10] In detail for this parallel between algorithms and associations, for German law, Gruber (2015, 267 ff.). See the decisions of the German Bundesgerichtshof, BGHZ 146, 341, 344; BGHZ 163, 154.

significant challenge for AI. A third important factor is whether the entity functions as an aggregate of individuals, as happens with entities like corporations (Banteka, 2020, p. 51). This criterion is difficult to apply to AI, as it lacks the collective identity and shared activity among individuals that underpin traditional social entities like corporations. It might be different for human-machine associations and swarms of interconnected algorithms.

Moreover, courts tend to use rights such as the right to sue, contract, and hold constitutional rights as prerequisites for legal personhood. Yet, these attributes are outcomes of legal personhood, not independent or objective indicators, creating a circular reasoning problem (Banteka, 2020, p. 52). This circularity may stem from the fact that courts tend to rely on conditions that artificial entities like corporations already possess by being socio-legal entities with concrete legal effects. Applying this logic to AI systems presents a more contentious challenge (Banteka, 2020, p. 52).

In cases not regulated by legislation, when courts must constructively interpret legal personhood for AI, the data reveal various criteria. For example, one case might emphasize the "ability to own property," "right to contract," "right to sue and be sued," and "constitutional rights," while another might prioritize the "ability to transact" and "perpetuity" instead. These variations often lack a clear rationale or any explicit hierarchy of importance (Banteka, 2020, p. 53). However, a hierarchy of various criteria is not unusual.

In conclusion, while the current data is limited and lacks the consistency needed to predict future judicial approaches reliably, it collectively suggests that direct judicial recognition of AI as a legal person is uncertain — unless prompted by political momentum and formalized through proper statuses. Without formal legislation, the vast and inconsistent range of conditions that may support the attribution of legal personhood (in different combinations) makes predictions challenging. Criteria for granting legal personhood may remain self-referential and arbitrary due to the circularity in judicial reasoning. If AI were to be recognized as legal persons, it might require these entities to first gain *de facto* legitimacy by exercising rights and fulfilling roles in socio-digital institutions over an extended period, similar to the historical process of recognition for corporations.

6. Near- and Long-Term Prospects: AI Agents and Embodied AI

Predicting future scenarios is always challenging; in this case, it is possibly worse, given the rapidly evolving technological (and policy) landscape. The historical correlations between technological paradigms, their acceptance in social practices, and the progression of this debate can help us outline potential scenarios.

It is essential to differentiate between near- to mid-term patterns (5 to 20 years) and long-term trends (more than 20 years). Before analysing these distinctions, consider a general observation: advancements in endowing AI systems with specific skills do not typically follow a steady, incremental path. Instead, they often occur as abrupt and significant leaps driven by new techniques (e.g., diffusion models for Large Language Models) — possibly developed with relatively few resources. Such rapid improvements, however, quickly hit performance plateaus, a pattern seen in domains like image and speech recognition.[11] This suggests that neither the recent successes of AI technologies nor the vast scale of investments in AI entail that such technologies are rapidly progressing toward general (AGI) or human-like intelligence. Therefore, at least in the

[11] Historical data shows both AI funding trends and performance improvements across different benchmark tests and capabilities: https://ourworldindata.org/brief-history-of-ai.

near-midterm, the legal personhood debate may not need to address the implications of AI reaching human-equivalent intelligence.

We are experiencing a rapid surge in generative models that create new content, such as text, images, and music. In just a few years, AI has evolved from recognizing images and language to generating them. Examples of these include Large Language Models like GPT-4. From 2022 to 2023, investments in generative AI have significantly increased — reports suggest they have more than quadrupled.[12]

While there is no certainty that this growth will maintain its current pace eventually, it is reasonable that these models will continue to evolve over the next few years, become integrated into a more comprehensive array of devices, and specialize in specific tasks across various industries. Future advancements may shift focus from merely expanding dataset sizes to emphasizing data that is more representative, reliable, and pertinent to particular domains. This approach aligns with the development of specialized small language models (Fu et al., 2023).

Another promising field concerns AI agents with autonomous decision-making capabilities in simulated environments. These agents can execute tasks customized to user preferences, with the potential to evolve into personalized avatars or digital twins that closely mirror their human counterparts. This development complicates ongoing debates about AI legal personhood, particularly as these agents increasingly function as proxies or extensions of their users (Cheong, 2024). Questions about the extent of their decision-making autonomy will arise and highlight the need for careful examination of legal frameworks concerning principal-agent relations, guardianship and representation.

In the near and mid-term, a vital issue to reconsider is that, as AI spans many technologies and subcategories, capturing the full breadth of AI under a single regulatory framework is increasingly challenging. In other words, labelling everything under "AI" could lead to regulatory inconsistencies and potential overreach.[13] Current frameworks, such as the EU AI Act, already reflect this complexity by establishing distinct norms based on some technical classification. For example, foundation models (General Purpose AI, GPAI) are regulated separately from specialized AI systems: e.g., they are subject to specific risk taxonomies and mitigation strategies based on performance metrics like computational power (i.e., floating-point operations per second, FLOPS). On top of that, regulations may vary significantly according to the particular domains in which these AI systems are deployed (e.g., AI for law enforcement requires different safeguards compared to AI for employment).

This layered regulatory approach highlights the need for increasingly nuanced distinctions when considering assigning rights or duties to AI systems. For instance, a higher level of legal autonomy — e.g., recognition of a system's active role in initiating contractual relations or violating legal norms — might be more feasible or advantageous for specific AI systems depending on their computational capabilities or the risk level in their deployment context. Low-risk systems — such as virtual assistants used in routine, low-stakes interactions — might warrant lighter regulatory requirements and limited forms of legal autonomy (and, therefore, legal personhood). At the same time, higher-risk applications could require less legal autonomy. Ultimately, a risk-based taxonomy, or a more hierarchical and principled one, could guide the development of tailored legal statuses based on gradients of legal personhood (Mocanu, 2022).

There is no consensus or reliable prediction regarding long-term trends, such as the timeline for achieving human-like intelligence or the development of transformative AI.

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[12] Source: https://ourworldindata.org/data-insights/investment-in-generative-ai-has-surged-recently.

[13] For this reason, some authors have suggested lawmakers should not use AI as a category for regulation at all (Braun, 2024).

While expert surveys have attempted to forecast these milestones, their predictions have, more often than not, proven inaccurate in retrospect. A notable area with profound long-term implications is the integration of AI with Brain-Machine Interfaces (BMIs), which, despite its transformative potential, may advance sooner than expected. Currently, BMIs are primarily used in healthcare and rehabilitation — e.g., in restoring motor functions — but the convergence of AI with BMIs could also expand applications to human enhancement: AI-driven brain stimulation has the potential to optimize cognitive functions and memory and even regulate emotions. In this context, A more speculative and controversial proposal has suggested embedding artificial memories directly into individuals' brains to modify behavior within rehabilitative settings like prisons to evoke specific emotional responses, such as empathy or remorse.[14]

The embodiment of AI devices and their becoming part of the human mind — particularly within frameworks like the Extended Mind Thesis (Bublitz, 2024) — can fundamentally reshape discussions about legal personhood for AI by first redefining the legal concept of human personhood. In this context, AI would no longer be seen as an independent entity requiring its own legal status. Instead, it would become an extension of an individual's legal identity, effectively merging with the natural person. This shift would necessitate rethinking legal frameworks, including eliminating third-party property rights over such devices, given their integration into human identity. This integration could change perceptions of human agency, as individuals might assume formal responsibility for the actions or outputs of their embodied AI devices, similar to their accountability for unconscious desires or intentions (Bublitz, 2024).

An alternative interpretation would avoid the anthropocentric bias — which is implied in the idea that a human mind, with its full richness of meaning, is augmented with a merely technical extension — and instead use the above-mentioned concept of hybrids developed in the actor-network theory (Latour, 2004, 70 ff.). Hybridity would account for the variety of symmetric/asymmetric relations between humans and algorithms (Rauer, 2024, 484 ff.). Moreover, it would move the ascription of action and responsibility from the human individual to the human-machine association (Neuhäuser, 2015, 143 f.). The law would have to follow suit and attribute legal personhood to a human-machine association. Indeed, this would be a radical option, as it has not been tried for algorithmic communication. Several authors suggest granting legal capacity to hybrids (Beckers and Teubner, 2023; Monterossi, 2020, 11; Taylor and De Leeuw, 2020, 6). Applying the law of associations to the human-algorithm association implies that the hybrid would become both a collective actor and a legal person to which action capacities and full responsibilities are ascribed.

Bibliography

Abott, R. (2018). The Reasonable Computer: Disrupting the Paradigm of Tort Liability. *George Washington Law Review,* 86**,** 1-45.

Allain, J. S. (2013). From Jeopardy! to Jaundice: The Medical Liability Implications of Dr. Watson and Other Artificial Intelligence Systems. *Louisiana Law Review,* 73**,** 1049-1079.

Allen, C., Smit, I. & Wallach, W. (2005). Artificial morality: Top-down, bottom-up, and hybrid approaches. *Ethics and Information Technology,* 7**,** 149-155.

Allgrove, B. (2004). *Legal Personality for Artificial Intellects: Pragmatic Solution or Science Fiction?* (SSRN Scholarly Paper 926015). https://doi.org/10.2139/ssrn.926015

[14] This is the Cognify Project; source: https://wired.me/technology/cognify-prison-of-future/.

Andrade, F., Novais, P., Machado, J., & Neves, J. (2007). Contracting agents: Legal personality and representation. *Artificial Intelligence and Law*, *15*(4), 357–373. https://doi.org/10.1007/s10506-007-9046-0.

Arendt, H. (1966). *The Origins of Totalitarianism*. Harvest-Harcourt.

Asaro, P. (2007). *Robots and Responsibility from a Legal Perspective*. https://www.semanticscholar.org/paper/Robots-and-Responsibility-from-a-Legal-Perspective-Asaro/24d74f0060b26393f4bce1f6220ac1b96616f509

Baecker, D. (2011). Who Qualifies for Communication? A Systems Perspective on Human and Other Possibly Intelligent Beings Taking Part in the Next Society. *TATuP – Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis,* 20**,** 17-26.

Banteka, N. (2020). Artificially Intelligent Persons. *Houston Law Review*, *58*(3), 537–596.

Bayern, S., Burri, T., Grant, T. D., Hausermann, D. M., Moslein, F., & Williams, R. (2017). Company Law and Autonomous Systems: A Blueprint for Lawyers, Entrepreneurs, and Regulators. *Hastings Science and Technology Law Journal*, *9*(2), 135–162.

Beckers, A. & Teubner, G. (2021). *Three Liability Regimes for Artificial Intelligence: Algorithmic Actants, Hybrids, Crowds*. Hart.

Beckers, A. & Teubner, G. (2023). Human-Algorithm Hybrids as (Quasi)Organisations? On the Accountability of Digital Collective Actors. *Journal of Law and Society,* 49**,** 100-119.

Birhane, A., van Dijk, J., & Pasquale, F. (2024). *Debunking Robot Rights Metaphysically, Ethically, and Legally* (arXiv:2404.10072). arXiv. https://doi.org/10.48550/arXiv.2404.10072

Boyle, J. (2023). *The Line: Ai and the Future of Personhood*. MIT.

Braun, D. (2024). Why 'Artificial Intelligence' Should Not Be Regulated. *Digit. Gov.: Res. Pract.* https://doi.org/10.1145/3696010

Brown, R. D. (2021). Property ownership and the legal personhood of artificial intelligence. *Information & Communications Technology Law*, *30*(2), 208–234. https://doi.org/10.1080/13600834.2020.1861714

Bryson, J. J., Diamantis, M. E., & Grant, T. D. (2017). Of, for, and by the people: The legal lacuna of synthetic persons. *Artificial Intelligence and Law*, *25*(3), 273–291. https://doi.org/10.1007/s10506-017-9214-9

Bublitz, J. C. (2024). Might artificial intelligence become part of the person, and what are the key ethical and legal implications? *AI & SOCIETY*, *39*(3), 1095–1106. https://doi.org/10.1007/s00146-022-01584-y

Butler, T. L. (1981). Can a Computer be an Author—Copyright Aspects of Artificial Intelligence A Media Labor Law Symposium. *(Comm/Ent), A Journal of Communications and Entertainment Law*, *4*(4), 707–748.

Chagal-Feferkorn, K. A. (2018). The Reasonable Algorithm. *University of Illinois Journal of Law, Technology & Policy***,** 111-147.

Chen, J., & Burgess, P. (2019). The boundaries of legal personhood: How spontaneous intelligence can problematize differences between humans, artificial intelligence, companies and animals. *Artificial Intelligence and Law*, *27*(1), 73–92. https://doi.org/10.1007/s10506-018-9229-x

Cheong, B. C. (2024). *The Rise of AI Avatars: Legal Personhood, Rights and Liabilities in an Evolving Metaverse*. https://doi.org/10.17863/CAM.109175

Chesterman, S. (2020). Artificial Intelligence And The Limits Of Legal Personality. *International & Comparative Law Quarterly*, *69*(4), 819–844. https://doi.org/10.1017/S0020589320000366

Chesterman, S. (2021). *We, the Robots?: Regulating Artificial Intelligence and the Limits of the Law*. Cambridge University Press. https://doi.org/10.1017/9781009047081

Chinen, M. A. (2016). The Co-Evolution of Autonomous Machines and Legal Responsibility. *Vanderbilt Journal of Law & Technology*, 20**,** 338-393.

Chopra, S., & White, L. F. (2011). *A Legal Theory for Autonomous Artificial Agents*. University of Michigan Press. https://doi.org/10.3998/mpub.356801

Coeckelbergh, M. (2012). Moral Responsibility, Technology, and Experiences of the Tragic: From Kierkgeaard to Offshore Engineering. *Science and Engineering Ethics*, 18**,** 35-48.

Cohen, J. E. (2019). *Between Truth and Power: The Legal Constructions of Informational Capitalism*. Oxford University Press.

Cole, G. (1990). Tort Liability for Artificial Intelligence and Expert Systems, 10 Computer L.J. 127 (1990). *UIC John Marshall Journal of Information Technology & Privacy Law*, *10*(2). https://repository.law.uic.edu/jitpl/vol10/iss2/1

Dahiyat, E. (2021). Law and Software Agents: Are They "Agents" by the Way? *Artificial Intelligence and Law*, 29**,** 59-86.

Dahiyat, E. A. R. (2007). Intelligent Agents and Contracts: Is a Conceptual Rethink Imperative? *Artificial Intelligence and Law*, *15*(4), 375–390. https://doi.org/10.1007/s10506-007-9047-z

Dremliuga, R., Kuznetcov, P., & Mamychev, A. (2019). Criteria for Recognition of AI as a Legal Person. *Journal of Politics and Law*, *12*(3), Article 3. https://doi.org/10.5539/jpl.v12n3p105

Ebers, M. (2021). Liability for Artificial Intelligence and EU Consumer Law. *JIPITEC*, 12**,** 204-220.

Erdélyi, O. J. & Erdélyi, G. (2020). The AI Liability Puzzle and a Fund-Based Work-Around. *AIES '20: Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society*,**,** 50-56.

Esposito, E. (2017). Artificial Communication? The Production of Contingency by Algorithms. *Zeitschrift für Soziologie*, 46**,** 249-265.

Floridi, L. & Sanders, J. W. (2011). On the Morality of Artificial Agents. In Anderson, M. & Anderson, S. L. (eds.) *Machine Ethics*. (pp. 184-212). Cambridge University Press.

Floridi, L., & Taddeo, M. (2018). Romans would have denied robots legal personhood. *Nature*, *557*(7705), 309–309. https://doi.org/10.1038/d41586-018-05154-5

Floridi, L. (2023). The Ethics of Artificial Intelligence. Oxford University Press.

Forrest, H. K. B. (2024). The Ethics and Challenges of Legal Personhood for AI. *The Yale Law Journal Forum*, *133*.

Fu, Y., Peng, H., Ou, L., Sabharwal, A., & Khot, T. (2023). Specializing Smaller Language Models towards Multi-Step Reasoning. *Proceedings of the 40th International Conference on Machine Learning*, 10421–10430.https://proceedings.mlr.press/v202/fu23d.html.

Gemignani, M. (1984). Laying Down the Law to Robots. *San Diego Law Review*, *21*(5), 1043.

Gordon, J.-S. (2021). Artificial moral and legal personhood. *AI & SOCIETY*, *36*(2), 457–471. https://doi.org/10.1007/s00146-020-01063-2

Gruber, M.-C. (2015). Bioinformationsrecht: Zur Persönlichkeitsentfaltung des Menschen in technisierter Verfassung. Mohr Siebeck.

Gruber, M.-C. (2015). Was spricht gegen Maschinenrechte? In Gruber, M.-C., Bung, J. & Ziemann, S. (eds.) Autonome Automaten: Künstliche Körper und artifizielle Agenten in der technisierten Gesellschaft. (pp. 191-206). Berliner Wissenschaftsverlag.

Grundmann, S., Micklitz, H. & Renner, M. (2021). *New Private Law Theory: A Pluralist Approach*. Cambridge University Press.

Gunkel, D. J. (2024). The rights of robots. In *Non-Human Rights* (pp. 66–87). Edward Elgar Publishing. https://www.elgaronline.com/edcollchap/book/9781802208528/book-part-9781802208528-9.xml

Hallevy, G. (2010). The Criminal Liability of Artificial Intelligence Entities—From Science Fiction to Legal Social Control. *Akron Intellectual Property Journal*, *4*(2), 171–202.

Hildebrandt, M. (2015). *Smart Technologies and the End(s) of Law*. Edward Elgar.

Horwitz, M. J. (1985). Santa Clara Revisited: The Development of Corporate Theory. *West Virginia Law Review,* 88**,** 173-224.

Hubbard, F. P. (2010). 'Do Androids Dream?': Personhood and Intelligent Artifacts. *Temple Law Review*. https://www.semanticscholar.org/paper/%27Do-Androids-Dream%27%3A-Personhood-and-Intelligent-Hubbard/6adcaaf1c6781ab3f851ca5bce345f5c3e2f8a9f

Jaynes, T. L. (2020). Legal personhood for artificial intelligence: Citizenship as the exception to the rule. *AI & SOCIETY*, *35*(2), 343–354. https://doi.org/10.1007/s00146-019-00897-9

Jowitt, J. (2021). Assessing contemporary legislative proposals for their compatibility with a natural law case for AI legal personhood. *AI & SOCIETY*, *36*(2), 499–508. https://doi.org/10.1007/s00146-020-00979-z

Kantorowicz, E. H. (1957). *The Kings' Two Bodies. A Study in Mediaeval Political Theology*. Princeton University Press.

Karnow, C. (1994). The Encrypted Self: Fleshing Out the Rights of Electronic Personalities, 13 J. Marshall J. Computer & Info. L. 1 (1994). *UIC John Marshall Journal of Information Technology & Privacy Law*, *13*(1). https://repository.law.uic.edu/jitpl/vol13/iss1/1

Kersten, J. (2019). KI-Kunst – Künstliche Intelligenz und künstlerische Freiheit. In Ismer, R., Reimer, E., Rust, A. & Waldhoff, C. (eds.) Territorialität und Personalität. (pp. 437–452). Otto Schmidt.

Koops, B.-J. & Jaquet-Chiffelle, D.-O. (2008). *New (Id)entities and the Law: Perspectives on Legal Personhood for Non-Humans*. FIDIS - Future of Identity in the Information Society.

Kornilakis, A. (2023). Legal Personhood for Autonomous AI: Practical Consequences in Private Law. In A. Kornilakis, G. Nouskalis, V. Pergantis, & T. Tzimas (Eds.), *Artificial Intelligence and Normative Challenges: International and Comparative Legal Perspectives* (pp. 27–37). Springer International Publishing. https://doi.org/10.1007/978-3-031-41081-9_3

Kostenko, O. M., Bieliakov, K. I., Tykhomyrov, O. O., & Aristova, I. V. (2024). "Legal personality" of artificial intelligence: Methodological problems of scientific reasoning by Ukrainian and EU experts. *AI & SOCIETY*, *39*(4), 1683–1693. https://doi.org/10.1007/s00146-023-01641-0

Kouravanas, N., & Pavlopoulos, A. (2022). Social Robots: The Case of Robot Sophia. *Homo Virtualis*, *5*(1), Article 1. https://doi.org/10.12681/homvir.30320

Kovac, M. (2020). *Judgement-Proof Robots and Artificial Intelligence: A Comparative Law and Economics Approach* Palgrave.

Krafft, T. D., Zweig, K. A. & König, P. D. (2022). How to Regulate Algorithmic Decision-Making: A Framework of Regulatory Requirements for Different Applications. *Regulation & Governance,* 16**,** 119-136.

Kurki, V. A. (2019). *A Theory of Legal Personhood*. Oxford University Press. https://doi.org/10.1093/oso/9780198844037.001.0001

Latour, B. (2004). *Politics of Nature: How to Bring the Sciences into Democracy*. Harvard University Press.

Lior, A. (2020). AI Entities as AI Agents: Artificial Intelligence Liability and the AI Respondeat Superior Analogy. *Mitchell Hamline Law Review*, 46**,** 1043-1102.

Luhmann, N. (2012/2013). *Theory of Society 1/2*. Stanford University Press.

Martínez, E., & Winter, C. (2021). Protecting Sentient Artificial Intelligence: A Survey of Lay Intuitions on Standing, Personhood, and General Legal Protection. *Frontiers in Robotics and AI*, *8*. https://doi.org/10.3389/frobt.2021.788355

Misselhorn, C. (2015). Collective Agency and Cooperation in Natural and Artificial Systems. In Misselhorn, C. (ed.) *Collective Agency and Cooperation in Natural and Artificial Systems: Explanation, Implementation and Simulation*. (pp. 3-24). Springer.

Mocanu, D. M. (2022). Gradient Legal Personhood for AI Systems—Painting Continental Legal Shapes Made to Fit Analytical Molds. *Frontiers in Robotics and AI*, *8*. https://www.frontiersin.org/articles/10.3389/frobt.2021.788179.

Monterossi, M. W. (2020). Liability for the Fact of Autonomous Artificial Intelligence Agents. Things, Agencies and Legal Actors. *Global Jurist,* 6**,** 1-18.

Naffine, N. (2009). *Law's Meaning of Life: Philosophy, Religion, Darwin and the Legal Person* (1st Edition). Hart Publishing.

Neuhäuser, C. (2015). Some Sceptical Remarks Regarding Robot Responsibility and a Way Forward. In Misselhorn, C. (ed.) *Collective Agency and Cooperation in Natural and Artificial Systems*. (pp. 131-147). Springer.

Nerantzi, E. and Sartor, G. (2024). 'Hard AI-crime': The deterrence turn. *Oxford Journal of Legal Studies*, 44:673–701.

Novelli, C. (2023). Legal personhood for the integration of AI systems in the social context: A study hypothesis. *AI & SOCIETY*, *38*(4), 1347–1359. https://doi.org/10.1007/s00146-021-01384-w.

Novelli, C., Bongiovanni, G., & Sartor, G. (2022). A conceptual framework for legal personality and its application to AI. *Jurisprudence*, *13*(2), 196–291. https://doi.org/10.1080/20403313.2021.2010936

Nowik, P. (2021). Electronic personhood for artificial intelligence in the workplace. *Computer Law & Security Review*, *42*, 105584. https://doi.org/10.1016/j.clsr.2021.105584

O'Donnell, E. L. & Talbot-Jones, J. (2018). Creating Legal Rights for Rivers: Lessons from Australia, New Zealand, and India. Ecology and Society, 23, Art. 7.

Oberson, X. (2017). Taxing Robots? From the Emergence of an Electronic Ability to Pay to a Tax on Robots or the Use of Robots. *World Tax Journal*, *2017*(2), 247–261.

Ohlin, J. (2005). Is the Concept of the Person Necessary for Human Rights? *Cornell Law Faculty Publications*. https://scholarship.law.cornell.edu/facpub/434

Pagallo, U. (2018). Vital, Sophia, and Co.—The Quest for the Legal Personhood of Robots. *Information*, *9*(9), Article 9. https://doi.org/10.3390/info9090230

Parviainen, J., & Coeckelbergh, M. (2021). The political choreography of the Sophia robot: Beyond robot rights and citizenship to political performances for the social robotics market. *AI & SOCIETY*, *36*(3), 715–724. https://doi.org/10.1007/s00146-020-01104-w

Pettit, P. (2007). Responsibility Incorporated. *Ethics,* 117**,** 171-201.

Powell, D. (2020). Autonomous Systems as Legal Agents: Directly by the Recognition of Personhood or Indirectly by the Alchemy of Algorithmic Entities. *Duke Law & Technology Review,* 18**,** 306-331.

Rahwan, I., Cebrian, M., Obradovich, N., Bongard, J., Bonnefon, J.-F., Breazeal, C., Crandall, J. W., Christakis, N. A., Couzin, I. D., Jackson, M. O., Jennings, N. R., Kamar, E., Kloumann, I. M., Larochelle, H., Lazer, D., Mcelreath, R., Mislove,

A., Parkes, D. C., Pentland, A. S., Roberts, M. E., Shariff, A., Tenenbaum, J. B. & Wellman, M. (2019). Machine Behaviour. *Nature,* 568**,** 477-486.

Rammert, W. (2012). Distributed Agency and Advanced Technology: Or: How to Analyze Constellations of Collective Inter-agency. In Passoth, J.-H., Peuker, B. & Schillmeier, M. (eds.) *Agency Without Actors: New Approaches to Collective Action*. (pp. 89-111). Routledge.

Rauer, V. (2024). From Interaction to Transformaction: The Consequences of Artificial Intelligence for Theories of Social Action. In Heinlein, M. & Huchler, N. (eds.) *Artificial Intelligence in Society: Social, Political and Cultural Implications of a Technological Innovation*. (pp. 81-109). Springer Fachmedien Wiesbaden.

Ross, A. (1957). Tû-Tû. *Harvard Law Review*, *70*(5), 812–825. https://doi.org/10.2307/1337744

Sartor, G. (2009). Legal concepts as inferential nodes and ontological categories. *Artificial Intelligence and Law*, *17*(3), 217–251.

Schirmer, J.-E. (2019). Artificial Intelligence and Legal Personality. In Wischmeyer, T. & Rademacher, T. (eds.) *Regulating Artificial Intelligence*. (pp. 123-142). Springer.

Schirmer, J.-E. (2020). Artificial Intelligence and Legal Personality: Introducing "Teilrechtsfähigkeit": A Partial Legal Status Made in Germany. In T. Wischmeyer & T. Rademacher (Eds.), *Regulating Artificial Intelligence* (pp. 123–142). Springer International Publishing. https://doi.org/10.1007/978-3-030-32361-5_6

Sartor, G. (2009). Cognitive automata and the law: Electronic contracting and the intention-ality of software agents. *Artificial Intelligence and Law*, 17:253–90.

Schwarz, G. (1908). Rechtssubjekt u. Rechtszweck. *Archiv fürFur Büurgerliches Recht*, *32*, 1–24.

Selbst, A. (2020). Negligence and AI's Human Users. *Boston University Law Review,* 100**,** 1315-1376.

Shapiro, R. N. (1982). Of Robots, Persons, and the Protection of Religious Beliefs. *Southern California Law Review*, *56*, 1277.

Simmler, M., & Markwalder, N. (2019). Guilty Robots? – Rethinking the Nature of Culpability and Legal Personhood in an Age of Artificial Intelligence. *Criminal Law Forum*, *30*(1), 1–31. https://doi.org/10.1007/s10609-018-9360-0

Solaiman, S. M. (2017). Legal personality of robots, corporations, idols and chimpanzees: A quest for legitimacy. *Artificial Intelligence and Law*, *25*(2), 155–179. https://doi.org/10.1007/s10506-016-9192-3

Solum, L. (1992). Legal Personhood for Artificial Intelligences. *North Carolina Law Review*, *70*(4), 1231.

Taylor, S. M. & De Leeuw, M. (2020). Guidance Systems: From Autonomous Directives to Legal Sensor-Bilities. *AI & Society (Open Forum)***,** 1-14.

Teubner, G. (1988). Enterprise Corporatism: New Industrial Policy and the 'Essence' of the Legal Person. *The American Journal of Comparative Law,* 36**,** 130-155.

Teubner, G. (2025). Emergence and Personification: How the Law Makes Non-Human Entities Speak. In Rogowski, R. (ed.) *Research Handbook on Law and Systems Theory*. (pp. Elgar.

Thürmel, S. (2015). The Participatory Turn: A Multidimensional Gradual Agency Concept for Human and Non-human Actors. In Misselhorn, C. (ed.) *Collective Agency and Cooperation in Natural and Artificial Systems: Explanation, Implementation and Simulation*. (pp. 45-62).

Trüstedt, K. (2020). Representing Agency. *Law & Literature,* 32**,** 195-206.

Tuchler, D. J. (1978). Man-made man and the law. *Saint Louis University Law Journal, 22(2), 310-25*

Turner, J. (2018). *Robot Rules: Regulating Artificial Intelligence*. Palgrave Macmillan.

van den Hoven van Genderen, R. (2018). Do We Need New Legal Personhood in the Age of Robots and AI? In M. Corrales, M. Fenwick, & N. Forgó (Eds.), *Robotics, AI and the Future of Law* (pp. 15–55). Springer. https://doi.org/10.1007/978-981-13-2874-9_2

Vesting, T. (2023). *Subjectivity Transformed: The Cultural Foundation of Liberty in Modernity*. Polity Press.

Vladeck, D. (2014). Machines Without Principals: Liability Rules and Artificial Intelligence. *Washington Law Review*, *89*(1), 117.

Vladeck, D. C. (2014). Machines without Principals: Liability Rules and Artificial Intelligence. *Washington Law Review*, 89**,** 117-150.

Wielsch, D. (2018). Contract Interpretation Regimes. *Modern Law Review,* 81**,** 958-988.

Willick, M. S. (1983). Artificial Intelligence: Some Legal Approaches and Implications. *AI Magazine*, *4*(2), 5–16. https://doi.org/10.1609/aimag.v4i2.392

Willick, M. S. (1985). Constitutional law and artificial intelligence: The potential legal recognition of computers as 'persons'. *Proceedings of the 9th International Joint Conference on Artificial Intelligence - Volume 2*, 1271–1273.

Wittgenstein, L. (1953). *Philosophical investigations. Philosophische Untersuchungen*. Macmillan.

Wojtczak, S. (2022). Endowing Artificial Intelligence with Legal Subjectivity. *AI & SOCIETY*, *37*(1), 205–213. https://doi.org/10.1007/s00146-021-01147-7

Zatti, P. (1975). *Persone giuridiche e soggettività*. Cedam.

Zech, H. (2021). Liability for AI: Public policy considerations. *ERA Forum*, *22*(1), 147–158. https://doi.org/10.1007/s12027-020-00648-0

Zekos, G. I. (2021). *Economics and Law of Artificial Intelligence: Finance, Economic Impacts, Risk Management and Governance*. Springer.

Ziemianin, K. (2021). Civil legal personality of artificial intelligence: Future or utopia? *Internet Policy Review*, *10*(2), 1–22. https://doi.org/10.14763/2021.2.1544.